



SOUTHERN CALIFORNIA
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Demand Response

Wholesale market triggers in response to intermittent renewables

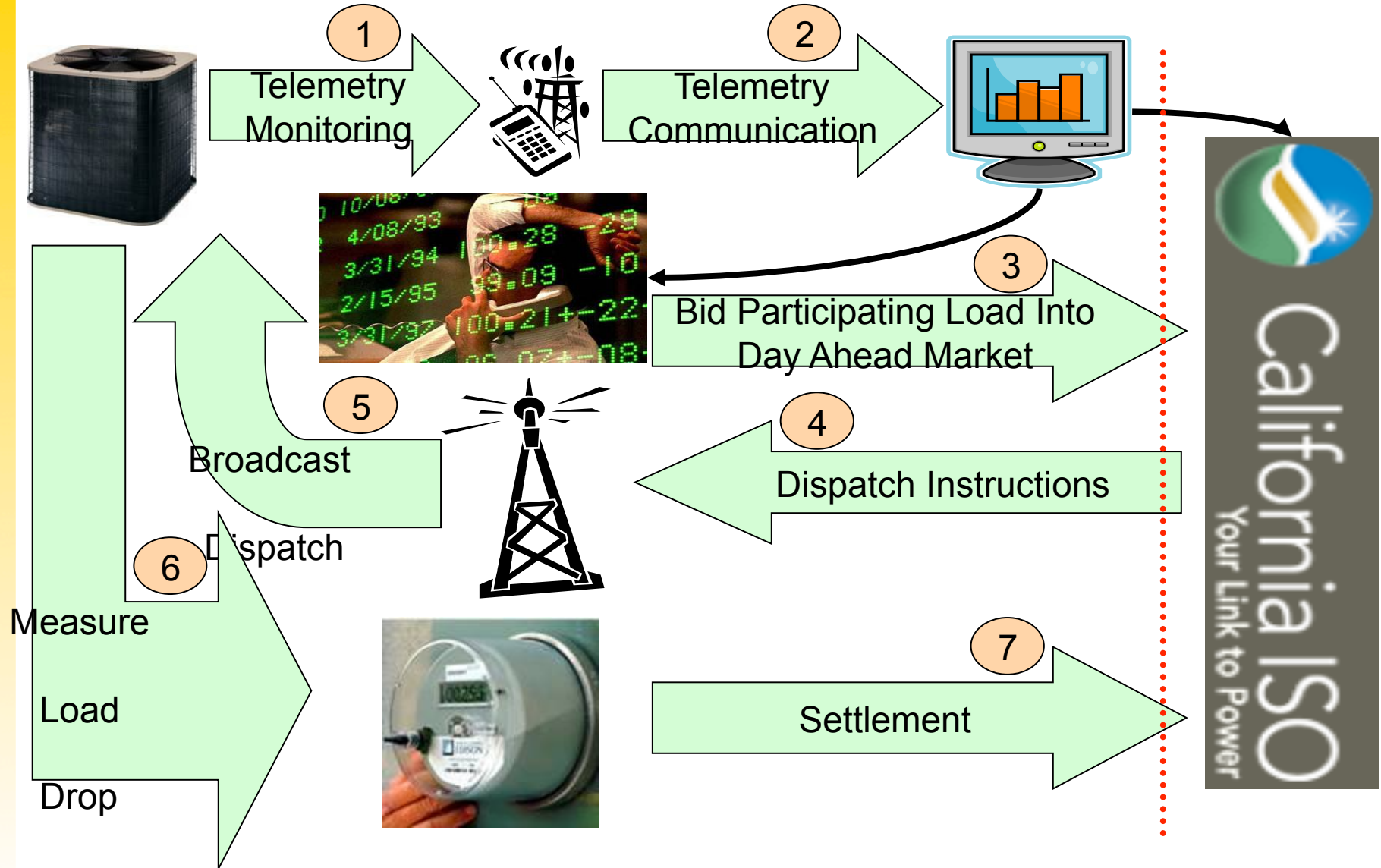
Wholesale markets for Demand Response

- **CAISO operates a series of procedures and markets that together comprise the CAISO Markets Processes.**
- **To further the CAISO goal to increase demand response (DR) participation in its wholesale electricity markets, the ISO has developed two new Demand Response product offerings:**
 - Proxy Demand Resource (PDR)
 - Reliability Demand Response Product (RDRP)
- **A Scheduling Coordinator (SC) that represents a PDR can bid into the following markets:**
 - Day-ahead energy market including Residual Unit Commitment (RUC)
 - Day-ahead and Real-Time Non-Spinning Reserve market
 - 5- Minute Real-Time Energy market
 - And eventually the Hour-Ahead Scheduling Process (HASP) after a significant implementation effort

DR as a Contingent Ancillary Service

- **An Ancillary Service (AS) resource can be registered as a “contingent” resource**
 - Contingent resources are made available in the market when another resource does not perform as scheduled
 - This mechanism will likely be utilized to trigger DR or other contingent AS resources when intermittent renewables do not perform as scheduled
- **There are challenges for DR to provide AS**
 - IOUs working with CAISO to address alternative approaches for
 - Telemetry providing 4 second or 1 minute updates on resource load
 - 5 minute settlement (when retail meters have 15 minute or 1 hour intervals)
 - Determining the retail compensation for customer participation in a wholesale market product
 - CPUC DR OIR Phase IV Part 2 will address some of these issues
- **Automated Demand Response (AutoDR) is required in order for customers to react quickly enough to respond to AS dispatches**
 - SCE utilizes OpenADR through the Internet for large commercial & industrial customers
 - SCE will utilize ZigBee Smart Energy Profile 2.0 (SEP 2.0) enabled through Edison SmartConnect™ for residential and small/medium commercial & industrial customers
 - OpenADR & SEP 2.0 are NIST identified standards for Smart Grid

Pilot testing of A/C load DR as a Non-Spinning Ancillary Service



Typical dispatch from 2009 pilot with 3200 A/C units

